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ABSTRACT

The concept of self-regulation--the process whereby students activate and sustain behaviors and cognitive paths which are systematically oriented toward attainment of learning goals--is increasing in importance among educators. Self-regulation includes activities such as attending to instruction; organizing, coding, and rehearsing information; establishing a productive work environment; using resources effectively; holding positive beliefs about capabilities; and experiencing pride and satisfaction about one's efforts. This paper presents theory and research that demonstrate positive effects of attributions and attributional feedback on self-regulation of learners. Developmental changes in the formation and meanings of attributions are discussed, with an emphasis on perceptions of ability and effort. Suggestions for classroom teaching to enhance student self-regulation are provided. Contains 39 references. (Author/BGC)

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Attributions and the Development of Self-Regulatory Competence

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Abstract

Self-regulation refers to the process whereby learners direct their cognitions, motivation, and behaviors, toward the attainment of their academic goals. Effective self-regulation requires learning goals, a sense of self-efficacy (perceived competence) for learning, and positive attributions (perceived causes of outcomes) that enhance self-efficacy and motivation. Theory and research are presented that demonstrate positive effects of attributions and attributional feedback on self-regulation and that highlight important causal and correlational relations among attributions and achievement outcomes. Developmental changes in the formation and meanings of attributions are discussed with emphasis on perceptions of ability and effort. Suggestions for classroom teaching to enhance student self-regulation are provided.

Attributions and the Development of Self-Regulatory Competence

Self-regulation refers to the process whereby students activate and sustain behaviors, cognitions, and affects, which are systematically oriented toward the attainment of learning goals (Zimmerman, 1989, 1990, 1994). Self-regulation includes such activities as: attending to and concentrating on instruction; organizing, coding, and rehearsing information to be remembered; establishing a productive work environment; using resources effectively; holding positive beliefs about one's capabilities, the value of learning, the factors influencing learning, and the anticipated outcomes of actions; and experiencing pride and satisfaction with one's efforts (Schunk, 1994).

Self-regulation is assuming increasing importance among educators. Research shows that students are mentally active during learning rather than being passive recipients of information, and that they exert a large degree of control over attainment of their goals (Pintrich & Schrauben, 1992). Educators are realizing the importance of students developing self-regulatory competence in addition to subject-area knowledge and skills.

Effective self-regulation requires that students have goals and the motivation to attain them (Bandura, 1986; Zimmerman, 1989). Students must regulate not only their actions but also their underlying achievement cognitions,

beliefs, intentions, motives, and affects. An important class of motives includes attributions, or beliefs about the causes of outcomes (Weiner, 1992). Research supports the hypothesis that effective self-regulation depends on forming positive attributions that promote perceptions of competence (self-efficacy) and sustain motivation directed toward learning (Schunk, 1994).

In this paper I address the role of attributions in the development of self-regulatory competence. I initially summarize theoretical ideas involving self-regulation, self-efficacy, attributions, and developmental changes in the attributional process. I then present research investigating attributions in achievement settings. Evidence comes from two sources--attributional feedback studies and research exploring causal and correlational processes among attributions and other achievement outcomes--and focuses on the self-regulation of ability and effort attributions. I conclude by discussing implications of the research for classroom teaching to enhance student self-regulation.

Theoretical Background

Social Cognitive Theory of Self-Regulation

Social cognitive theory views self-regulation as comprising three processes: self-observation, self-judgment, self-reaction (Bandura, 1986; Kanfer & Gaelick, 1986). Self-observation is deliberate attention to aspects of one's behavior. Self-observation is necessary but by

itself insufficient for sustained self-regulation. Self-judgment refers to comparing present performance with one's goal. Such comparisons inform one of goal progress and can exert motivational effects on future performance. Self-reactions to goal progress may be evaluative or tangible. Evaluative reactions involve beliefs about progress. The belief that one is making progress, along with the anticipated satisfaction of goal attainment, enhances self-efficacy and sustains motivation. People also may react in a tangible fashion to perceived progress by buying something they want or taking a night off from studying.

At the start of learning activities students have such goals as acquiring skills and knowledge, finishing work, and making good grades. As they work, students observe, judge, and react to perceptions of their goal progress. These self-regulatory processes interact with one another. As students observe aspects of their behavior they judge them against standards and react positively or negatively. Their evaluations and reactions set the stage for additional observations of the same behaviors or of others. These processes also interact with the environment (Zimmerman, 1989). Students who judge their learning progress as inadequate may react by asking for teacher assistance. Teachers then may teach students a more efficient strategy, which students use to foster learning.

Self-Efficacy

Effective self-regulation depends on students developing a sense of self-efficacy for learning and performing well. Self-efficacy refers to personal beliefs about one's capabilities to learn or perform behaviors and skillful actions at designated levels (Bandura, 1986). Self-efficacy is hypothesized to influence choice of activities, effort, persistence, and achievement. Compared with students who doubt their learning capabilities, those with high self-efficacy for accomplishing a task participate more readily, work harder, persist longer when they encounter difficulties, and achieve at a higher level.

Learners acquire information to appraise their self-efficacy from their performances, vicarious (observational) experiences, forms of persuasion, and physiological reactions (Schunk, 1989). Information acquired from these sources does not influence self-efficacy automatically but rather is cognitively appraised (Bandura, 1986). Learners weigh and combine their perceptions of their ability, task difficulty, amount of effort expended, amount and type of assistance received from others, similarity to models, and persuader credibility (Schunk, 1989).

Effective self-regulation depends on holding an optimal sense of self-efficacy for learning (Bandura, 1986; Bouffard-Bouchard, Parent, & Larivee, 1991; Zimmerman, 1989). Students who feel efficacious about learning choose to engage in tasks, select effective strategies, expend effort, and persist when difficulties are encountered

(Bandura, 1991; Schunk, 1991; Zimmerman, 1989). As students work on a task they compare their performances to their goals. Self-evaluations of progress enhance self-efficacy and keep students motivated to improve.

Attributions

Attribution theory originated with Heider's (1958) naive analysis of action, which examines how ordinary people view the causes of important events. Guided by Heider's work, Weiner and colleagues (1979, 1985, 1992; Weiner et al., 1971) formulated an attributional theory of achievement behavior. This theory postulates that students attribute their achievement outcomes to such factors as ability, effort, task difficulty, and luck. These are not the only attributions given by students--there are many others including help from others and illness--but these four are commonly perceived as causes of achievement outcomes. Attributions are given general weights, and for any given outcome one or two factors will be perceived as primarily responsible. For example, a student who fails a math exam might attribute it to low ability ("I'm not good at math") and to low effort ("I didn't study hard enough").

Causes can be represented along three dimensions with reference to the individual: internal or external, relatively stable or unstable over time, and controllable or uncontrollable. Ability generally is viewed as internal, stable, and uncontrollable; effort as internal, unstable, and controllable. Students use situational cues to form

attributions. Salient ability cues are success attained easily or early in the course of learning and many successes. Effort cues are physical or mental exertion, and persisting for a lengthy period. Task difficulty cues include task features (e.g., length of math problem or passage to read) and social norms (whether other students perform well or poorly). Luck cues are random outcomes and lack of relation between one's actions and outcomes (e.g., playing a slot machine).

Attributions are hypothesized to affect students' expectations, motivation, and emotions (Weiner, 1992). Stability influences expectancy of success. Assuming that task conditions remain much the same, success ascribed to stable causes (high ability, low task difficulty) results in higher expectancies of success (self-efficacy) than does success attributed to unstable causes (effort, luck). Locus influences affective reactions. Learners experience greater pride (shame) after succeeding (failing) when outcomes are attributed to internal causes rather than to external ones. Controllability has diverse effects. Feelings of control increase one's choice of academic tasks, effort, persistence, and achievement (Bandura, 1986). The perceptions of little control over outcomes negatively affects expectations, motivation, and emotions (Licht & Kistner, 1986).

Development and the Self-Regulation of Attributions

Effective self-regulation depends on holding an optimal sense of self-efficacy for learning (Bandura, 1986; Bouffard-Bouchard et al., 1991; Zimmerman, 1989). As students work on a task they compare their performances to their goals. Self-evaluations of progress maintain self-efficacy for learning and motivation at optimal levels.

Although low self-efficacy is detrimental, effective self-regulation does not require that self-efficacy be extremely high. Salomon (1984) found that lower self-efficacy led to greater mental effort and better learning than when self-efficacy was higher. Assuming that learners feel efficacious enough to surmount difficulties, harboring some doubt about whether one will succeed may mobilize effort and effective use of strategies better than will feeling overly confident.

Effective self-regulation depends on students making attributions that enhance self-efficacy and motivation. Attributions enter into self-regulation during the self-judgment and self-reaction stages when students compare and evaluate their performances (Schunk, 1994). Whether goal progress is judged acceptable depends on its attribution. Students who attribute success to factors over which they have little control, such as luck or task ease, may hold a low sense of self-efficacy if they believe they probably cannot succeed on their own. If they think that they lack the ability to perform well, they may judge learning progress as deficient and be unmotivated to work harder.

Students who attribute success to a combination of ability, effort, and strategy use, should feel efficacious about learning and remain motivated to work diligently.

Developmental changes occur in how children extract information from cues and form achievement attributions (Pintrich & Schunk, 1996). At any point in time there are many cues that one might use to arrive at attributions for outcomes. Children are especially prone to focus on salient cues and possibly downplay or ignore other more-relevant and potent cues. With development, students are able to consider information from multiple sources and are less swayed by salience. This implies that young children may benefit especially from attributional feedback that links outcomes with attributions.

The meanings of attributions change with development. Young children tend to attribute successes to effort and generally equate effort and ability in meaning. They feel that people who try harder are smarter and tend to do better. Beginning around age 9 and continuing to about age 12 children differentiate the concepts of effort and ability (Nicholls, 1978, 1979; Nicholls & Miller, 1984). They increasingly come to believe that students who try equally hard may not attain the same outcome because of ability differences. By adolescence, students have distinct conceptions of effort and ability. Ability is viewed in the sense of a capacity that can limit the amount of improvement gained through effort. Students also understand that if

outcomes are the same, then lower effort implies higher ability. With development, ability attributions become increasingly important, whereas the influence of effort as a causal factor declines in importance (Harari & Covington, 1981).

Developmental evidence modifies some of the predictions of attribution theory. Children do not view ability as stable; rather, as children progress through school they are improving their ability in various domains. Thus, they are more likely to view ability in an incremental fashion rather than as a fixed entity (Dweck & Leggett, 1988). Further, failure attributed to low ability--viewed as highly detrimental from an attributional perspective (Schunk, 1994)--may not be so bad after all. If children expect to raise ability over time, then they also may expect future success.

Research Evidence

In this section I review some research that investigates self-regulation and attributions in achievement settings. Most attributional research has not been primarily directed toward exploring how students self-regulate attributions but rather has examined the influences on attributions and their effects on achievement outcomes. I briefly discuss evidence from two sources: studies investigating attributional feedback and self-regulation, and research exploring causal and correlational processes among attributions and achievement outcomes.

Attributional Feedback and Self-Regulation

Evidence bearing on self-efficacy and attributions comes from studies in which investigators attempt to modify learners' attributions and achievement outcomes by providing feedback linking their successes or failures with one or more attributions. These attributional feedback studies show that such feedback changes students' attributions (e.g., Andrews & Debus, 1978; Carr & Borkowski, 1989; Dweck, 1975); however, many studies did not explore how feedback exerts its effects or assess self-efficacy. There also are studies in which attributions were not assessed but which show that attributional feedback influences self-efficacy (Schunk, 1982; Schunk & Gunn, 1985).

A series of studies demonstrates that attributional feedback affects students' attributions and self-efficacy (Schunk, 1983, 1984; Schunk & Cox, 1986; Schunk & Rice, 1986). In the Schunk (1983) study, for example, children lacking subtraction skills received instruction and self-directed practice solving problems over sessions. Students were assigned randomly to one of four feedback conditions: ability, effort, ability plus effort, none. During the problem solving, ability-feedback children periodically received verbal feedback linking their successful problem solving with ability (e.g., "You're good at this"), effort-feedback subjects received effort statements ("You've been working hard"), ability-plus-effort students received both forms of feedback, and no-feedback students did not receive

attributional feedback. Self-efficacy and subtraction skill were assessed following the last instructional session. Children also judged the amount of effort they expended during the sessions.

Ability feedback promoted self-efficacy and skill more than did effort feedback, ability-plus-effort feedback, and no feedback. The effort and ability-plus-effort conditions outperformed the no-feedback group. Compared with the no-feedback condition, the other three conditions displayed greater self-regulated learning (problem solving during self-directed practice). The effort and ability-plus-effort conditions judged effort expenditure greater than the ability group, who judged effort higher than the no-feedback condition. The ability-plus-effort group may have discounted some ability information; they might have wondered how good they were after being told that they were working hard to succeed.

Other evidence that attributions relate to self-regulated learning comes from a study by Schunk and Cox (1986), who provided subtraction instruction with practice to students with learning disabilities. Children received either effort feedback during the first half of the instructional program, during the second half of the program, or no effort feedback. The results showed that effort feedback enhanced self-efficacy, skill, and problem solving during independent practice time (which required application of self-regulatory strategies), more than no

effort feedback. Effort feedback led to higher effort attributions than no feedback. Students who received effort feedback during the first half of the instructional program judged effort to be a more important cause of success than subjects who received feedback during the second half.

The role of attributions in the regulation of strategy use was studied by Schunk and Rice (1986), who provided children with reading difficulties with instruction and practice in identifying important ideas. One condition (ability-ability) periodically received ability feedback for their successful comprehension, a second condition (effort-effort) received effort feedback, a third condition (ability-effort) was given ability feedback during the first half of the instructional program and effort feedback during the second half, and for a fourth condition (effort-ability) this sequence was reversed. Self-regulatory processes were involved because children were taught a comprehension strategy and were largely on their own during the sessions to apply it.

The four conditions did not differ in comprehension skill acquisition but ability-ability and effort-ability students judged self-efficacy higher following instruction than did students in the effort-effort and ability-effort conditions. Children who received ability feedback during the second half of the instructional program placed greater emphasis on ability as a cause of success than children who received effort feedback during the second half. Ability-

effort students made higher effort attributions than did ability-ability children.

Other attributional feedback studies show different patterns of attributions as being more effective. Contrary to the results of Schunk and Rice (1986), Schunk (1984) found that early ability feedback was more effective than later feedback. This difference is difficult to resolve given that studies differed in content, type of subjects, and number and format of instructional sessions. Despite this inconsistency in results, it is clear that attributional feedback is related to students' self-regulated use of strategies in learning contexts.

Relich, Debus, and Walker (1986) explored the link between attributional feedback for successes and failures and achievement outcomes. The feedback stressed effort and ability (e.g., "That's incorrect; I know you have the ability but you just have to try harder"). Relative to a control condition, students who received feedback displayed higher self-efficacy and skill, were less likely to attribute failure to low ability, and placed greater emphasis on effort as a cause of outcomes.

Other research in which attributional feedback was not provided shows that self-efficacy and attributions are important self-regulatory components. Butkowsky and Willows (1980) found that relative to poor readers, good and average readers hold higher expectancies for success, persist longer on tasks, are less likely to attribute failure to internal

and stable causes (e.g., low ability), and more likely to attribute success to ability. Poor readers also show the greatest decline in expectancy of success following failure. Collins (1982) examined children's self-efficacy for solving mathematical word problems. Children were classified as high, average, or low ability. Regardless of ability group, high-efficacy students chose to rework more problems they missed than did low-efficacy students. The latter also reported lower ratings for their ability relative to that of peers than did high-efficacy students. High-efficacy children were more likely than low-efficacy students to attribute failure to low effort.

Harari and Covington (1981) explored developmental changes in perceptions of achievement attributions among students who ranged from first grade through college and who evaluated the performances of hypothetical students. Across grade levels students valued high ability more than low ability. With regard to effort, elementary and middle school students valued high effort more than low effort, but high school, college, and first grade students, valued high and low effort equally. The developmental trend in ability-effort covariation was obtained: High effort related to higher ability in the lower grades, but low effort information resulted in higher ability estimates among high school and college students. Ability attributions become increasingly valued, whereas effort attributions declined in importance.

This research is promising and suggests that the acquisition of strategic competence during learning is aided by the self-regulation of attributions. Future research should explore in greater depth how students maintain effective attributional beliefs as they encounter difficulties and obstacles in learning. Such research also might illuminate the process whereby students self-regulate attributions and how self-regulation changes with development and as a function of students acquiring skills (i.e., an incremental conception of ability).

Causal and Correlational Processes

Researchers have investigated the relation of self-efficacy and attributions to each other and to achievement outcomes. Many studies have obtained significant and positive correlations between self-efficacy and skillful performance (Schunk, 1994). Most studies also have obtained positive correlations between ability attributions and self-efficacy. Schunk and Cox (1986) found a positive relation between effort attributions for success and self-efficacy. Self-efficacy correlates positively with attributions of success to task ease and negatively with attributions to luck (Schunk & Gunn, 1986). Relich et al. (1986) found that a measure that emphasized effort as a cause of outcomes and de-emphasized ability as a cause of failure correlated positively with self-efficacy and achievement.

Studies have obtained positive correlations between achievement and attributions of success to ability, effort,

and task ease (Schunk, 1994). Schunk (1984) found a negative correlation between achievement and luck attributions. Schunk and Cox (1986) obtained a positive correlation between ability and effort attributions for success.

Schunk and Gunn (1986) explored through regression and causal analysis the influences on children's achievement outcomes. Children received instruction in long division and engaged in self-regulated learning and problem solving. During a portion of the sessions children verbalized aloud while solving problems. Verbalizations were classified as reflecting effective or ineffective problem-solving strategies, depending on whether they would lead to accurate solutions. Attributions for successful problem solving, self-efficacy, and skill, were assessed.

The largest direct influence on changes in students' division skill was due to use of effective strategies, but skill also was strongly affected by self-efficacy and effort attributions. Ability attributions for success exerted the strongest influence on self-efficacy, which suggests that instruction affects self-efficacy in part through the intervening influence of attributions. Luck attributions had a negative impact on self-efficacy. Taken together, these results show that the use of effective task strategies during self-regulated learning enhances skills, and that students maintaining positive attributional beliefs

stressing ability and effort for success raise their efficacy beliefs and skillful performance.

Relich et al. (1986) explored the effects of attributional feedback on attributions, self-efficacy, and achievement, as well as the relations among attributions, efficacy, and achievement. Attributional feedback exerted a direct effect on attributions, self-efficacy, and achievement; attributions influenced self-efficacy, and efficacy had a direct effect on achievement. Feedback affected achievement directly and indirectly through its effects on attributions and self-efficacy. The effect of attributions on achievement was weak, which suggests that much of the effect of attributions on achievement may occur through self-efficacy.

Implications for Practice

The preceding discussion has implications for classroom teaching to enhance students' self-regulation. One suggestion is to ensure that attributional feedback is credible and salient. Attributions stressed to students should match their perceptions of the factors contributing to their performances. Thus, students who have to work hard to succeed may reject feedback that highlights their high ability in the content area; conversely, those who succeed easily will not believe feedback attributing performance to hard work. When feedback stresses two or more attributions (e.g., ability and effort for success), students may assess their credibility, accept the most credible and discount the

least credible. They also may focus on the more salient one. This situation is common in school where teachers may emphasize ability and effort, but unless students perceive both as responsible they are apt to reject one in favor of the other.

Similarly, as students attempt to form and retain positive attributions during self-regulated learning it is necessary for the feedback they acquire to support these. They need to evaluate the credibility of their attributions. For example, if students believe that effort and strategy use are contributing to performance, they should periodically assess their level of effort and how strategy use is affecting their performance. Such self-evaluative opportunities may need to be built into the normal instructional program.

A related recommendation relates to the self-regulation process. In order for students to regulate their achievement beliefs, which include attributions and self-efficacy, they need to perform self-regulatory processes (self-observation, self-judgment, self-reaction). Students initially may need to be taught to engage in these processes if they are not used to doing so. They may have to learn how to self-monitor their performances and their efficacy and attributional beliefs, to judge whether performances are acceptable and whether their beliefs match that performance level, and to react by deciding to continue as they are or

to make strategic changes that may enhance their performance, efficacy, and attributions.

In some recent research studies, students have been trained to use one or more self-regulatory processes, which then were systematically incorporated into an instructional program (Sawyer, Graham, & Harris, 1992; Schunk & Swartz, 1993). Given that models constitute an important source of efficacy and attributional information, teachers might have models portray strategic behaviors and verbalize statements stressing such factors as efficacy for learning or performing well and attributions for success to ability, effort, or strategy use. The modeled statements can be included as part of a program designed to teach self-observation and self-evaluation. During the actual instruction, teachers might cue students periodically to make observations (e.g., record their progress) and self-evaluations of efficacy and attributions.

In summary, attributions are important self-regulatory processes. Theory and research support the idea that the acquisition of competence in academic domains depends in part on regulating one's beliefs concerning the causes of learning. There also are important developmental changes in the formation and meaning of attributions. Future research can explore methods for teaching self-regulatory skills and the mechanisms whereby students at various levels of development regulate attributional and other achievement

beliefs (e.g., self-efficacy) to maintain their motivation for learning at an optimal level.

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